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THE LATE LORD LISTER.

Probably every veterinary or medical weekly journal published to-day throughout the world is paying its tribute of homage to the great healer we have just lost. Our own is a short one, for two reasons. So much has been written during the last few days upon Lister's life-work, and much of it has been written so well, that it is difficult to add to what has already been said. And certainly, to those able to comprehend the magnitude of Lister's achievements, it seems impossible for any pen to do justice to the man and his work.

The story of the rise and progress of Listerian surgery has passed from scientific history into common knowledge. The man in the street knows how Lister sought for many years to combat the ghastly hospital mortality of his youth, how he perceived the bearing of Pasteur's work upon the problem, and how, the principle once grasped, he worked out his methods through all necessary modifications of detail to the triumphant conclusion. That he owed something to the French *savant* in no way detracts from the merit of his own work, but rather increases it. Few of the expert operating surgeons of those days had either the breadth of view to appreciate the possibilities arising from Pasteur's discoveries, or the practical chemical and microscopical knowledge necessary for their application to surgery. Fewer still, perhaps, possessed the steadfast purpose which enabled Lister to follow an untrodden road for years in the face of doubt and opposition. The fact is that Pasteur's early work on micro-organisms opened up a host of such untrodden roads, some of which Pasteur himself could never hope to follow. One was surgery, which Lister, by his temperament and early scientific studies, no less than by his professional opportunities and experience, was peculiarly fitted to take up. He did so, and lived to be recognised as the world's pioneer.

It has often been truly said that the benefits Lister conferred upon the world are incalculable. But we may and that they did not stop short at surgery. Apart from the many serious operations which have become trivial, and the many operations which have only become possible at all, under Listerian methods, it must be remembered that those methods have penetrated into medicine and sanitary science. Modern prophylaxis owes almost as much to Lister's work as does surgery. No one can guess the number of lives saved, or the amount of suffering averted, by the work of this one man. But we all know that the recent descriptions of him as the greatest medical benefactor the human race has ever possessed are no more than the truth.

Remembering the stupendous benefits he gave to the world, it is good to think that everything personally known of the man himself was much more than favourable. The world has owed much, directly and indirectly, to men whose motives and characters were largely ignoble. Science has owed much to men whose lives held little of the altruistic ideal. Lister was not of these. It was typical of his character that his sole motive in taking up his epoch-making work was the desire to lessen the death and suffering in the hospitals of those days, the constant sight of which would have hardened a man of coarser fibre. It was characteristic of him, also, that in his later years he seemed to think the success of the work itself to be his best reward.

We ought long ago to have enrolled Lister as an Honorary Associate of the R.C.V.S. We never did; but the Council, meeting a few years ago upon his birthday, sent their congratulations. A cordial reply was received, and is preserved in the College archives. In it the veteran acknowledged having received great assistance in his work from veterinary surgeons; but veterinary surgeons, all the world over, will reverence his memory as that of one of their greatest teachers.

THE DIAGNOSIS AND TREATMENT OF PLEURISY.

Marchal and Séjounant, in the course of an outbreak of equine pleuro-pneumonia, had the opportunity of testing certain diagnostic and therapeutic measures which are already customary in human medicine. They now record (*Bulletin de la Soc. Cent. de Méd. Vét., Recueil*) their results.

The authors tested the "signe du sou" or "Zeichen des Geldstucks" (= sign of the coin) diagnostic method of Prof. Pitres. This is carried out as follows. An assistant lays a ten-centime piece upon the thorax between two ribs, and strikes it with the edge of another ten-centime piece, while the veterinarian or medical man auscultates the thorax at a place opposite to that percussed. So long as the percussion goes on at a healthy region, the ear receives the sound in an accentuated form, in consequence of the resonance of the thorax. On a hepatised area, on the other hand, the resonance is dulled, as if the sound penetrated through a layer of plaster. When the percussion is carried out upon an exudate, however slight this may be, the sound is delayed, is clearer, and has a metallic ring, like that produced by striking a half-empty cask. This is explained by the fact that the conduction of sound through fluids, while it certainly takes place more slowly than that through gases,

does so more completely than the latter. The alteration of the sound is especially marked in the region lying closely over the level of the exudate.

Therapeutically, the authors have made very successful use of a method hitherto little practised in veterinary medicine. They advise thoracentesis as early as possible and the withdrawal of only a small quantity of the pleuritic exudate. The fluid withdrawn from the thorax is immediately injected subcutaneously. The authors find that small doses of the fluid are more active than large ones, and they have been accustomed to inject from 25 to 50 grammes (= approx 5-6ths. to 10-6ths. oz.)

This treatment causes a speedy reduction of the fever and a rapid resorption by the induction of a crisis of urination. Along with it, the authors endeavour to assist the organism in its reaction by generally stimulating, heart-strengthening and diuretic, but not irritating means. They have employed caffeine and camphor in large doses, injected intra-muscularly.

During the outbreak in question eighteen horses were affected with pleuro-pneumonia. Only the first one died; and this was *before* the application of the method of treatment described above.—(*Berliner Tier. Woch.*)

[This "sign of the coin" diagnostic method should be compared with the tracheal percussion of Smith and Schindelka.—*Transl.*]

Hæmorrhage into a Guttural Pouch with Mortal Sequel.

Wester records (*Tydschr. v. Veeartesnijkunde*) the case of a racehorse which, while at exercise, fell against an obstacle. He contracted a small wound on the inside of the right eye and showed slight nasal hæmorrhage. Six weeks later, he appeared absolutely normal. However, at the end of that time, a violent nasal hæmorrhage appeared; and, fifteen days later, this was repeated with the same intensity, especially upon the left side.

The animal was then brought to the Utrecht Veterinary School. His temperature was found to be normal; but the pulse was 72 to the minute, and was intermittent. It remained intermittent after light trotting exercise; but the number of pulsations then rose from 72 to 100 per minute. The appetite was normal, but the respirations counted 44 to the minute. The author believed the case to be one of cardiac hypertrophy, induced by overtraining.

At the end of six days, all the symptoms had improved so much that the horse showed little that was abnormal.

Eight o'clock on the night of the sixth day, however, the animal became nervous: the pulse rose to 96 per minute, and was irregular; the respirations were 40 per minute; while the temperature remained normal. Two hours later, a violent hæmorrhage set in from the mouth.

The next day, Wester found considerable engorgement of the throat and head, Marked dysphagia was present, and also dyspnea. The temperature was now 103·1 F., and the pulse 60 per miute. Tracheotomy was performed immediately, and a large quantity of water was seen to flow from the treacheotomy tube. This had been drunk by the horse, and had passed into the larynx without its passage provoking any reaction.

Next day, the engorgement of the throat and the general temperature had diminished, but the dysphagia remained unabated. The treatment applied was the subcutaneous administration of stimulants, and rectal feeding with milk. At the end of five days, the horse succeeded in swallowing a few oats, but a little water still continued to flow away from the tracheotomy tube when he drank. The heart's action had now become calmer and stronger.

The improvement only lasted for two days, at the end of which time the dyspnea again became intense. Manual exploration of the pharyngeal and laryngeal regions revealed nothing abnormal. The animal lost flesh progressively, and finally died from "pneumonia caused by foreign bodies."

Post-mortem, a diffuse inflammation of the larynx was found; but the pharynx was normal. The left guttural pouch, which was considerably dilated, contained a large blood clot. In the region of the superior angle of the pouch, the author clearly perceived a ruptured artery obliterated by a small clot of recent formation. It is probable that the hæmorrhage into the guttural pouch had been the starting point of all the morbid symptoms. The dyspneic troubles probably, should be attributed to a paralysis of the pharynx; and it may be presumed that the insensibilily of the larynx betrayed a similar condition of the laryngeal nerves. —(*Annales de Méd. Vét.*)

Foot-and-Mouth Disease in Horses.

It is known that horses possess a certain amount of receptivity to foot-and-mouth disease, although the cases of its transmission to them are very rare. Recently De Jong has observed an instance of such transmission to them, which he now records (*Tydschr. v, Veeartsenijkunde*). On the 15th of July last, three foals which had been weaned a few days before were placed in a field occupied by cattle affected with foot-and-mouth disease. Five days later, the foals showed the first symptoms of the disease, viz., difficult prehension of food, and salivation. The author, however, did not observe the special sound which affected cattle produce when chewing. The buccal mucous membrane showed aphthae—some intact and others burst—at different points.

On the 30th of July, one of the foals still shewed salivation, and traces of vesicles were still clearly apparent upon the tongue and in other portions of the mucous membrane. Lesions upon other parts of the body, notably upon the feet, did not exist.

This case proves that it is quite wrong, in dealing witb epizootics of foot-and-mouth disease, to confine the preventive regulations to ruminants and pigs,—(*Annales de Méd. Vét.*) W. R. C.

Bleeding in Hæmoglobinuria.

Wysmann is convinced that that bleeding is one of the best methods of treating hæmo-globinuria, because the alterations it produces in the larger

yessels are quickly transferred to the circulation in the peripheral vessels.

In acute cases one always notices the marked alteration in the pulse and the rapid painful breathing, which conditions are at once relieved by bleeding, and this relief is not merely mechanical, but a quantity of toxic products are removed.

Bleeding also induces activity in the secretion of urine and favours the indirect elimination of waste products much more rapidly than can be done by drugs, this has been physiologically demonatrated by Von Hoesslin. It is also probable in hæmoglobinuria that bleeding has a direct stimulating action on the hæmatopoeic organs, the medulla of the bones and spleen.

Of 43 of Wysmann's cases, 37 occurred during spring and 6 in summer, so he concludes that although cold may be a predisposing it is not an essential factor.

Four to eight litres of blood were taken from the jugular. In 10 cases the horses were off their legs, 7 of these died. Of 33 bled before they went down only one died.—(*Schweiz. Arch.*)

Granular Vaginitis.

Nopisch recommends surgical treatment for granular vaginitis. Scraping the roots of the growth and washing with sublimate 1 : 2000, he gets cures within three or four days.—(*Berliner Tier. Woch.*)

F. E. P.

As to the Nature of the Parasites of Leprosy and Tuberculosis.

By Alexander G. R. Foulerton, F.R.C.S., Lecturer on Bacteriology and on Public Health to the Middlesex Hospital Medical School.

In a recent communication Dr. Bayon, criticising an opinion expressed by Beauchamp Williams to the effect that "leprosy may be caused by, perhaps, several varieties of a highly pleomorphic streptothrix," remarks that "to suit Williams' view it"—that is to say, the parasite of leprosy—"would have to be an actinomyces also." As a matter of fact the generic terms, *Streptothrix* and *Actinomyces*, and *Oospora* and *Nocardia* also, are synonymous. The first of them is used by British pathologists generally, German pathologists appear to prefer usually the second, and the other two are in common use by French pathologists. A fifth generic synonym, *Cladothrix*, has fortunately fallen out of use. Consequently, the terms *Streptothrix* and *Actinomyces* are applicable equally as the generic designation of the parasite of leprosy. For there cannot be any reasonable doubt but that the parasites which Hansen identified in the tissues of lepers and described as *Bacillus lepra*, which Deycke was apparently the first to demonstrate in culture from leprous lesions, which Rost first succeeded in growing freely on artificial media, which Williams subsequently studied in full detail, and which have been isolated during the last year or two by a considerable number of bacteriologists, all belong to one and the same species (*Streptothrix leprae*) of "ray fungus" or streptothrix.

I have seen only stained cover-glass preparations of the acid-fast, and morphologically typical, streptothrix which Deycke obtained from cases of leprosy. But by the courtesy of Beauchamp Williams I have had opportunities of examining three strains of the organism which he has isolated from cases of leprosy occurring in Persia and India, and two strains of an identical organism which had been isolated by Rost.

It is certain that these latter parasites belong to a single species which, under certain conditions of culture on artificial media, presents a number of acid-fast rod forms which are identical with the acid-fast forms recognisable in leprous granulomata. And it is evident, I think, that this parasite is that which Deycke described under the name of *Streptothrix leproides*. Deycke, however, appears to have hesitated at first to accept as the essential parasite of leprosy a micro-organism which, being a streptothrix, did not conform in growth on artificial media with the then accepted morphology of Hansen's *Bacillus leprae*. Kedrowsky also recognised streptothrix forms in cultures of an organism which he isolated from a case of leprosy.

A review of modern literature concerning the parasite of leprosy shows that confusion as to the proper place in botanical classification of the specific infecting organism has been caused partly by the multiplicity of nomenclature already referred to, and partly by failure to connote the varying morphological phases of streptotricheæ generally at different stages of their life-cycle. This matter was dealt with fully in the Milroy Lectures for 1910, and need not be referred to again, except very briefly.

The type-form of the genus Streptothrix is represented by the tangled masses of branching mycelium found in pus when suppuration has occurred in cases of streptotrichosis. Similar tufts of branching mycelium, the branching being lateral and not dichotomous, can be demonstrated nearly always in young cultures of streptotricheæ in broth. The typically mycelial stage in the growth of the parasite is succeeded successively by stages of "segmentation" and "fragmentation." Rod-shaped, bacilli-like segments become differentiated along the length of the mycelial threads. Degeneration of intervening segments of the mycelium occurs with, or very soon after the segmentation—so that, when fragmentation follows, the original tuft of branching mycelium is replaced by a confused aggregation of bacillary forms, some of which are long and thread-like, whilst others may appear as short bacillary or spirillar forms. The occurrence meanwhile of "chain sporulation" complicates the morphological picture. In cultures on artificial media aerial hyphæ grow out from the surface of the mycelium, and present single chains of spores. When fragmentation occurs the aerial hyphæ become separated off from the mycelium, and then present exactly the appearance of streptococci. Later these chains break up, and the spores appear as isolated spherical bodies, or in pairs. It is probable also that endogenous spore formation occurs along the length of some of the isolated rod segments.

In an old culture of the streptothrix, therefore, one finds the following elements: Longer or shorter bacillary forms, some of which may have a spiral or wavy appearance, some of which may resemble diphtheroid bacilli, and some of which may have the stump of a lateral branch still attached; short chains of spores, which resemble exactly streptococci; and paired or isolated spores. All these elements stain deeply by Gram's method: and, except when traces of branching remain—and segments showing this may be very few and far between—the surviving elements of the original mass of mycelium are indistinguishable morphologically, according to their nature, from bacilli and cocci. Under varying accidental circumstances incidental to the examination of cultures on artificial media, the spherical spores of the streptothrix may appear in stained specimens, as though they might be streptococci, diplococci, isolated cocci, or irregularly grouped staphylococci. If a species happens to be one of the acid-fast streptotricheæ, a correct morphological interpretation of specimens stained by the Ziehl-Neelsen method is obscured in another way

by the fact that in many cases some only of the persistent rod-shaped or bacillary segments have acid-fast properties. Also, with most acid-fast streptotricheæ, as with Koch's parasite of tuberculosis, acquisition of acid-fast properties is a matter of age. Some species which have this property develop it early and show it in nearly all of the rod segments, whilst in other species acid-fast properties are acquired only after some weeks of growth on artificial media, and then the special property is manifest only in a small minority of the segments. And so it will be found that in specimens from old cultures of a typical acid-fast streptothrix—such as *St. Nocardii*, *St. eppingeri*, or *St. leprae*—which have been stained by the Ziehl-Neelsen method, not only have "bacillary" and "coccal" forms to be considered, but the bacillary forms are, apart from casual morphological variation, of two kinds—those which are acid-fast and those which are not so.

Something may be added generally as to the function of the spores and persistent rod form which in old cultures succeed the original branching mycelium of the streptothrix. With most of the numerous species which have now been examined in my laboratories, there is no possible doubt as to what happens when the organism is growing under conditions of culture on artificial media. Both the spores and the persistent rod forms of an old culture are capable, on transference to a new soil, of reproducing the branching mycelium which represents the type form of the genus. Under no circumstances of artificial culture has it appeared that rod segments are produced directly from pre-existing rod segments, and without the intervention of a mycelial stage. Equally, the spherical spores invariably sprout out into a new mycelial mass—a process which can be easily watched if an old culture of a quickly-growing species is kept for twenty-four hours in a drop of nutrient broth on a warm stage under the microscope. Also I have found clear microscopical evidence that the rod segments of a pathogenic streptothrix may develop into a new mass of branching mycelium under the conditions of parasitic life in an animal host. In some of the more slowly-growing species the intervention of the typical mycelial stage before the development of new persistent rod forms may be difficult to demonstrate when an old culture is transplanted in a fresh medium, and especially when the culture medium used is a solid one. But this difficulty arises from the fact that, growth being very slow on artificial media, segmentation and fragmentation of the mycelial threads follow so closely on increasing growth that it is almost impossible in some species to trace continuously the true morphology of the organism.

It is certain that the typical streptotricheæ present two distinct persistent and reproductive forms—spherical spores produced under conditions of artificial culture in special spore-bearing hyphæ, and rod segments. Either of these produces a new mycelium when transplanted in a fresh artificial culture medium; and the rod segments, as well as the spherical spores, are capable of producing similar mycelium in the tissues of an animal host. Further, whilst we have no evidence at present that the persistent rod forms are capable of directly reproducing themselves, as such, in growth on artificial media, there is a possibility that this direct reproduction may occur under strictly parasitic conditions. This possibility is suggested by what is known of the biology of *Sporothrix schenckii*, belonging to a closely allied but somewhat higher genus of mould fungi.

Sporothrix.

Some ten years ago I pointed out that Sporothrix presented two different reproductive forms which may be termed provisionally, and for purposes of distinction, endogenous "spores" and exogenous "spore bodies." The type form of Sporothrix when growing on artificial media is represented by a tangled mass of branching mycelium which resembles generally that of Streptothrix, but which is definitely septate, and of coarser character than the other. As the culture of Sporothrix grows older provision for reproduction is made in two ways. Spherical "spores" appear along the length of, and within, the comparatively coarse mycelial thread; and ovoid, yeast-like "spore bodies" bud out from the sides of the primary mycelial threads and from the extremity of secondary lateral branches. In course of time the mycelium degenerates and, as such, disappears; the only remnant of it is amorphous, Gram-staining *débris*. The persistent recognisable morphological elements in oldish cultures are the spherical "spores" and the yeast-like "spore bodies." If some of an old culture of Sporothrix is transferred to nutrient broth and afterwards watched on a warm stage under the microscope, it will be seen that each of the two morphologically different persistent elements gives rise to a new mycelium which sprouts out from either form, exactly as the nearly similar mycelium of a streptothrix sprouts out from either the sperical spore or the rod segment.

But whilst I have not hitherto been able to find any evidence as to the direct multiplication of the persistent rod forms of Streptotricheæ in growth on artificial media, it is otherwise with the persistent forms of Sporothrix. In old cultures of *Sporothrix schenckii* in a nutrient broth medium there are appearances which suggest direct multiplication of the persistent yeast like bodies. One finds in such a culture large yeast bodies, like to those which in younger cultures are seen sprouting out from the mycelium, in immediate contact with three, four, or more smaller yeast forms. Also, under the conditions of parasitic life, a direct multiplication of the yeast-like bodies, as suggested by Hektoen, appears to be indisputable. If a mouse be inoculated subcutaneously with either a young mycelial culture or with an older culture which contains only spherical and yeast forms, a slowly-extending infective infiltration of the subcutaneous tissue follows. On examination after death it is found that the area of infected granulomatous tissue is thickly crowded with Gram-staining yeast forms; but no trace of mycelium can be found. The appearances are, in short, those of a yeast infection, except that the parasites are present in much larger numbers than one finds usually in an experimental yeast infection. On transplanting these yeast forms of Sporothrix from the animal tissues in an artificial medium, a growth of the typical mycelial form occurs at once, with subsequent development of the persistent forms. It should be added that my own experiments were carried out with a culture of *Sporothrix schenckii* with which Hektoen had very kindly supplied me. And a statement made in the paper referred to, that "mycelium apparently does not occur under parasitic conditions," applies only to experimental infection of the mouse with the particular species. Pinoy, on the other hand, has described recently natural cases of infection of man by *Sporothrix beurmannii*, in which, whilst yeast forms predominated in the tissues, mycelial forms were found in and around the capillaries of the parts infected.

Bacillary Forms.

In view, however, of the evidence as to the reproduction of the persistent yeast forms of Sporothrix by direct multiplication, the possibility of a similar reproduction in parasitic life of the persistent rod segments or "bacillary" forms, of the streptothricheæ has to be considered seriously. And the comparison is the more interesting when we remember that just as reliance on the morphology on one particular phase of development of the parasites of leprosy and tuberculosis as it occurs more conspicuously in the tissues has, unchecked by

cultural investigation, been responsible for the inclusion of these diseases amongst the bacillary infections, so a similarly misplaced reliance on the morphological significance of a phase of the life-cycle of the parasite as it occurs in the tissues has caused error in the diagnosis of cases of sporotrichosis. It is obvious from published records that in the past certain cases of infective granulomata occurring in man, which were attributed to "yeast" or "protozoal" infection, were actually cases of sporotrichosis. The persistent yeast forms of Sporothrix in the tissues were mistaken for yeasts, or coccidia, as the case happened. It was not until Schenck succeeded in obtaining the parasite in culture, and until Hektoen added to our knowledge of it, that a correct determination of the nature of sporotrichoses was possible. Similarly Calvin, Frothingham, and Paige have quite recently proved, by the isolation of *Sporothrix schenckii* from the infected tissues, the true nature of epizootic lymphangitis of horses, a disease which had been regarded at one time as a protozoal infection, at another time as a yeast infection.

The rod segments of streptotricheæ generally representing persistent forms which are capable of reproducing the mycelial form of the parasite, and possibly also capable of direct multiplication as rod forms, the particular significance of the specially staining rod segments of the acid-fast species has to be considered next. The acid-fast properties are associated with the presence in the organism of special fatty bodies (neutral fats, fatty acids, and lipoids) whose biochemical relations have been studied especially by Much and his pupils. Much has shown that the fatty bodies are specific generally for the acid-fast group of organisms, and are capable of producing specific antibodies in the serum of infected animals. Thus the nastin obtained from the parasite of leprosy is capable of causing a powerful reaction when injected into patients with either leprosy or tuberculosis; and the similar nastin obtained from the parasite of tuberculosis will cause a reaction with patients having either infection. Much and Kössli have shown by a series of complement-fixation tests that other, and non-pathogenic, acid-fast organisms—a "smegma" bacillus and the "blind worm" bacillus—are capable of reacting as antigens with the serums of tuberculous patients. Wills has shown, by an extended series of complement-fixation experiments, that the serums of leprous and tuberculous patients, and of lower animals which have immunised artificially against the respective parasites, contain antibodies which are specific for either organism, and also for the two non-pathogenic species, with differences which are merely quantitative. An excellent summary of the work done in the direction indicated by Much and those associated with him is given in Will's paper, and affords strong additional evidence as to the close relationship between the parasites of leprosy and tuberculosis and certain other reputed bacilli of the acid-fast kind, whose relationship with the streptotricheæ has been suspected for many years.

But whilst the requirements of acid-fast properties is associated with the presence of certain specific fatty bodies which are apparently common to all the acid-fast group, it must be remembered that the possession of these properties is, in a sense, an accidental characteristic, and one which certainly depends to some extent on external circumstances. Experience with organisms such as *St. nocardii*, *St. eppingeri*, *St. caprae* and *St. leprae*, shows that the acquirement of acid-fast properties during growth on artificial media is a matter of much uncertainty. Sometimes a culture will show acid-fast segments within a week, or less, of the commencement of growth; in other cultures none will be found for three or four weeks. The general rule is that the older a particular culture is the more conspicuous are the acid-fast forms.

In the case of *St. leprae* it would appear that the conditions of parasitic life specially favour the acquirement of acid-fast properties; under saprophytic conditions of growth the rod segments tend to remain non-acid-fast. With Koch's parasite of tuberculosis acid-fast properties are acquired quickly during saprophytic growth; it is only in very young cultures that the non-acid-fast forms described by Klein and others can be demonstrated.

What evidence is available on the point suggests that the acid-fast forms of Streptothrix may represent not only persistent but also specially resistant elements. The spherical spores of the streptotricheæ are generally distinctly less resistant against injurious physical and chemical influences than are the spores of fission fungi; and it may be that a second resistant element—the acid-fast rod form—has come into existence. Thus Marino found that the acid-fast forms of the parasite of tuberculosis preserved their vitality for a considerable time in the intestinal canal of the leech, resisting the action of the digestive juices for as long as fifteen months. At the end of that time there was marked attenuation of virulence; but still inoculation of the parasites into the guinea-pig was followed in some cases by a very slow infection which resulted in death. There is also evidence of a probably similar kind with regard to the parasite of leprosy. It has been suggested that growth of this organism on artificial media is favoured in symbiosis with intestinal amœbæ, and Beauchamp Williams has recorded his own experiments bearing on this question. With certain strains of his streptothrix the acid-fast forms appeared to die out in the course of successive subcultures. Then subcultures which appeared to consist of non-acid-fast diphtheroid rod segments were mixed with amœbæ. At the end of forty-eight hours the amœbæ were found to be full of acid-fast rod segments. But an explanation other than that which supposes favourable symbiotic influences may be suggested. There is evidence that bacteria form a part of the natural food of the intestinal amœbæ, and of *Amoeba dysenteriae* in particular. And under the circumstances it would seem most likely that the amœbæ digest and assimilate the non-acid-fast segments of the streptothrix, and that in the struggle for prolonged existence other, more resistant, acid-fast forms survive, as Marino's experiments have shown to be the case with the acid-fast form of the parasite of tuberculosis which is resistant against the digestive ferments of the leech.—*Brit. Med. Journ.*

PROTECTION OF ANIMALS ACT, 1911.

[1 & 2 Geo. 5. Ch. 27].

Chapter 27.

An Act to consolidate, amend, and extend certain enactments relating to Animals and to Knackers; and to make further provision with respect thereto.

[18th August, 1911].

BE it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1.—(1) If any person—

(*a*) shall cruelly beat, kick, ill-treat, over-ride, over-drive, over-load, torture, infuriate, or terrify any animal, or shall cause or procure, or, being the owner, permit any animal to be so used, or shall, by wantonly or unreasonably doing or omitting to do any act, or causing or procuring the commission or omission of any act cause any unnecessary suffering, or, being the owner

permit any unnecessary suffering to be so caused to any animal : or

(*b*) shall convey or carry, or cause or procure, or, being the owner, permit to be conveyed or carried, any animal in such manner or position as to cause that animal any unnecessary suffering ; or

(*c*) shall cause, procure, or assist at the fighting or baiting of any animal ; or shall, keep, use, manage, or act or assist in the management of, any premises or place for the purpose, or partly for the purpose, of fighting or baiting any animal, or shall permit any premises or place to be so kept, managed, or used, or shall receive, or cause or procure any person to receive, money for the admission of any person to such premises or place ; or

(*d*) shall wilfully, without any reasonable cause or excuse, administer, or cause or procure, or being the owner permit, such administration of, any poisonous or injurious drug or substance to any animal, or shall wilfully, without any reasonable cause or excuse, cause any such substance to be taken by any animal ; or

(*e*) shall subject, or cause or procure, or being the owner permit, to be subjected, any animal to any operation which is performed without due care and humanity;

such person shall be guilty of an offence of cruelty within the meaning of this Act, and shall be liable upon summary conviction to a fine not exceeding twenty-five pounds, or alternatively, or in addition thereto, to be imprisoned, with or without hard labour, for any term not exceeding six months.

(2) For the purposes of this section, an owner shall be be deemed to have permitted cruelty within the meaning of this Act if he shall have failed to exercise reasonable care and supervision in respect of the protection of the animal therefrom :

Provided that, where an owner is convicted of permitting cruelty within the meaning of this Act by reason only of his having failed to exercise such care and supervision, he shall not be liable to imprisonment without the option of a fine.

(3) Nothing in this section shall render illegal any act lawfully done under the Cruelty to Animals Act, 1876, or shall apply—

(*a*) to the commission or omission of any act in the course of the destruction, or the preparation for destruction, of any animal as food for mankind, unless such destruction or such preparation was accompanied by the infliction of unnecessary suffering ; or

(*b*) to the coursing or hunting of any captive animal, unless such animal is liberated in an injured, mutilated, or exhausted condition ; but a captive animal shall not, for the purposes of this section, be deemed to be coursed or hunted before it is liberated for the purpose of being coursed or hunted, or after it has been re-captured, or if it is under control.

2. Where the owner of an animal is convicted of an offence of cruelty within the meaning of this Act, it shall be lawful for the court, if the court is satisfied that it would be cruel to keep the animal alive, to direct that the animal be destroyed, and to assign the animal to any suitable person for that purpose ; and the person to whom such animal is so assigned shall, as soon as possible, destroy such animal, or cause or procure such animal to be destroyed, in his presence without unnecessary suffering. Any reasonable expenses incurred in destroying the animal may be ordered by the court to be paid by the owner, and thereupon shall be recoverable summarily as a civil debt :

Provided that, unless the owner assent, no order shall be made under this section except upon the evidence of a duly registered veterinary surgeon.

3. If the owner of any animal shall be guilty of cruelty within the meaning of this Act to the animal, the court, upon his conviction thereof, may, if they think fit, in addition to any other punishment, deprive such person of the ownership of the animal, and may make such order as to the disposal of the animal as they think fit under the circumstances :

Provided that no order shall be made under this section, unless it is shown by evidence as to a previous conviction, or as to the character of the owner, or otherwise, that the animal, if left with the owner, is likely to be exposed to further cruelty.

4. If any person shall, by cruelty within the meaning of this Act to any animal, do or cause to be done, any damage or injury to the animal or any person or property, he shall upon conviction for the cruelty under this Act, be liable upon the application of the person aggrieved to be ordered to pay as compensation to the person who shall sustain damage or injury as aforesaid, such sum not exceeding ten pounds, as the court before whom he is convicted may consider reasonable :

Provided that this section shall not—

(*a*) prevent the taking of any other legal proceedings in respect of any such damage or injury, so that a person be not twice proceeded against in respect of the same claim ; nor

(*b*) affect the liability of any person to be proceeded against and punished under this Act for an offence of cruelty within the meaning of the Act.

5.—(1) Every person who shall carry on, or assist in carrying on, the trade or business of a knacker shall observe and conform to the regulations set out in the First Schedule to this Act, and, if any person, carrying on or assisting in the carrying on of the said trade or business, contravenes or fails to comply with, or causes or procures or permits any contravention or non-compliance with, any such regulation, he shall be liable upon summary conviction to a fine not exceeding ten pounds.

(2) Any constable shall have a right to enter any knacker's yard at any hour by day, or at any hour when business is or apparently is in progress or is usually carried on therein, for the purpose of examining whether there is or has been any contravention of or non-compliance with the provisions of this Act, and, if any person refuses to permit any constable to enter any premises which he is entitled to enter under this section, or obstructs or impedes him in the execution of his duty under this section, he shall, upon summary conviction, be liable to a fine not exceeding five pounds.

(3) For the purposes of section one, which relates to offences of cruelty, of this Act, a knacker shall be deemed to be the owner of any animal delivered to him.

(4) For the purposes of this Act, an animal shall be deemed to have been delivered to a knacker if it has been delivered either to the knacker himself, or to any person on his behalf, or at the knacker's yard.

6.—(1) It shall not be lawful for any person who shall be licensed to slaughter horses, during the time while such licence shall be in force, to carry on the trade or business of a dealer in horses.

(2) If any person shall act in contravention of this section, he shall be liable upon summary conviction to a fine not exceeding ten pounds.

7.—(1) Any person who impounds or confines, or causes to be impounded or confined, any animal in any pound shall, while the animal is so impounded or confined, supply it with a sufficient quantity of wholesome and suitable food and water, and, if he fails to do so, he shall be liable upon summary conviction to a fine not exceeding five pounds.

(2) If any animal is impounded or confined in any pound and is without sufficient suitable food or water for six successive hours, or longer, any person may

enter the pound for the purpose of supplying the animal therewith.

(3) The reasonable cost of the food and water supplied to any animal impounded or confined in any pound shall be recoverable summarily from the owner of the animal as a civil debt.

8.—If any person—

(*a*) shall sell, or offer or expose for sale, or give away, or cause or procure any person to sell or offer or expose for sale or give away, or knowingly be a party to the sale or offering or exposing for sale or giving away of any grain or seed which has been rendered poisonous except for *bona fide* use in agriculture; or

(*b*) shall knowingly put or place, or cause or procure any person to put or place, or knowingly be a party to the putting or placing, in or upon any land or building any poison, or any fluid or edible matter (not being sown seed or grain) which has been rendered poisonous,

such person shall, upon summary conviction, be liable to a fine not exceeding ten pounds:

Provided that, in any proceedings under paragraph (*b*) of this section, it shall be a defence that the poison was placed by the accused for the purpose of destroying rats, mice, or other small vermin, and that he took all reasonable precautions to prevent access thereto of dogs, cats, fowls, or other domestic animals.

9.—If any person shall use, or cause or procure, or being the owner permit, to be used, any dog for the purpose of drawing or helping to draw any cart, carriage, truck, or barrow, on any public highway, he shall be liable upon summary conviction in respect of the first offence to a fine not exceeding two pounds, and in respect of the second or any subsequent offence to a fine not exceeding five pounds.

10.—Any person who sets, or causes or procures to be set, any spring trap for the purpose of catching any hare or rabbit, or which is so placed as to be likely to catch any hare or rabbit, shall inspect, or cause some competent person to inspect, the trap at reasonable intervals of time and at least once every day between sunrise and sunset, and, if any person shall fail to comply with the provisions of this section, he shall be liable, upon summary conviction, to a fine not exceeding five pounds.

11.—(1) If a police constable finds any animal so diseased or so severely injured or in such a physical condition that, in his opinion, having regard to the means available for removing the animal, there is no possibility of removing it without cruelty, he shall, if the owner is absent or refuses to consent to the destruction of the animal, at once summon a duly registered veterinary surgeon, if any such veterinary surgeon resides within a reasonable distance, and, if it appears by the certificate of such veterinary surgeon that the animal is mortally injured, or so severely injured, or so diseased, or in such physical conditon, that it is cruel to keep it alive, it shall be lawful for the police constable, without the consent of the owner, to slaughter the animal, or cause or procure it to be slaughtered, with such instruments or appliances, and with such precautions, and in such manner, as to inflict as little suffering as practicable, and, if the slaughter takes place on any public highway, to remove the carcase or cause or procure it to be removed therefrom.

(2) If any veterinary surgeon summoned under this section certifies that the injured animal can without cruelty be removed, it shall be the duty of the person in charge of the animal to cause it forthwith to be removed with as little suffering as possible, and, if that person fail so to do, the police constable may, without the consent of that person, cause the animal forthwith to be so removed.

(3) Any expense which may be reasonably incurred by any constable in carrying out the provisions of this section (including the expenses of any veterinary surgeon summoned by the constable, and whether the animal is slaughtered under this section or not) may be recovered from the owner summarily as a civil debt, and, subject thereto, any such expense shall be defrayed out of the fund from which the expenses of the police are payable in the area in which the animal is found.

(4) For the purposes of this section, the expression "animal" means any horse, mule, ass, bull, sheep, goat, or pig.

12.—(1) A police constable may apprehend without warrant any person who he has reason to believe is guilty of an offence under this Act which is punishable by imprisonment without the option of a fine, whether upon his own view thereof or upon the complaint and information of any other person who shall declare his name and place of abode to such constable.

(2) Where a person having charge of a vehicle or animal is apprehended by a police constable for an offence under this Act, it shall be lawful for that or any other constable to take charge of such vehicle or animal, and to deposit the same in some place of safe custody until the termination of the proceedings or until the court shall direct such vehicle or animal to be delivered to the person charged or the owner, and the reasonable costs of such detention, including the reasonable costs of veterinary treatment where such treatment is required, shall, in the event of a conviction in respect of the said animal, be recoverable from the owner summarily as a civil debt, or, where the owner himself is convicted, shall be part of the costs of the case.

13.—(1) Where proceedings are instituted under this Act against the driver or conductor of any vehicle, it shall be lawful for the court to issue a summons directed to the employer of the driver or conductor, as the case may be, requiring him, if it is in his power so to do, to produce the driver or conductor at the hearing of the case.

(2) Where proceedings are instituted under this Act, it shall be lawful for the court to issue a summons directed to the owner of the animal requiring him to produce either at, or at any time before, the hearing of the case, as may be stated in the summons, the animal for the inspection of the court, if such production is possible without cruelty.

(3) Where a summons is issued under either of the foregoing subsections of this section, and the owner or employer, as the case may be, fails to comply therewith without satisfactory excuse, he shall be liable upon summary conviction to a fine not exceeding five pounds for the first occasion, and not exceeding ten pounds for the second or any subsequent occasion, on which he so fails, and may be required to pay the costs of any adjournment rendered necessary by his failure.

14.—(1) An appeal shall lie from any conviction or order (other than an order for the destruction of an animal) by a court of summary jurisdiction under this Act to quarter sessions.

(2) Where there is an appeal by the owner of an animal from any conviction or order by a court of summary jurisdiction under this Act, the court may direct that the recognisance required to be entered into under subsection (3) of section thirty-one, which relates to procedure on appeal to general or quarter sessions, of the Summary Jurisdiction Act, 1879, shall include an undertaking not to sell or part with the animal until the appeal is determined or abandoned, and to produce it on the hearing of the appeal if such production is possible without cruelty.

15.—In this Act, except the context otherwise requires, or it is otherwise expressly provided—

(*a*) the expression "animal" means any domestic or captive animal;

(*b*) the expression "domestic animal" means any horse, ass, mule, bull, sheep, pig, goat, dog, cat, or fowl, or any other animal of whatsoever kind or species, and whether a quadruped or not which is tame or which has been or is being sufficiently tamed to serve some purpose for the use of man;

(*c*) the expression "captive animal" means any animal (not being a domestic animal) of whatsoever kind or species, and whether a quadruped or not, including any bird, fish, or reptile, which is in captivity, or confinement, or which is maimed, pinioned, or subjected to any appliance or contrivance for the purpose of hindering or preventing its escape from captivity or confinement;

(*d*) the expression "horse" includes any mare, gelding, pony, foal, colt, filly, or stallion; and the expression "bull" includes any cow, bullock, heifer, calf, steer, or ox, and the expression "sheep" includes any lamb, ewe, or ram; and the expression "pig" includes any boar, hog, or sow; and the expression "goat" includes a kid; and the expression "dog" includes any bitch, sapling, or puppy; and the expression "cat" includes a kitten; and the expression "fowl" includes any cock, hen, chicken, capon, turkey, goose, gander, duck, drake, guinea-fowl, peacock, peahen, swan, or pigeon;

(*e*) The expression "knacker" means a person whose trade or business it is to kill any cattle not killed for the purpose of the flesh being used as butcher's meat, and the expression "knacker's yard" means any building or place used for the purpose, or partly for the purpose, of such trade or business, and the expression "cattle" includes any horse, ass, mule, bull, sheep, goat, or pig;

(*f*) The expression "pound," used in relation to the impounding or confining of animals, includes any receptacle of a like nature.

16. This Act shall not apply to Scotland.

17. This Act in its application to Ireland shall be subject to the following modifications, namely:—

(1) (*a*) Section twenty-three of the Summary Jurisdiction (Ireland) Act, 1851 (which gives a right to appeal) shall apply as respects any conviction or order under this Act (other than an order for the destruction of an animal), notwithstanding that the fine imposed does not exceed twenty shillings or that the term of imprisonment imposed does not exceed one month;

(*b*) A reference to section twenty-four of the Petty Session (Ireland) Act, 1851, shall be substituted for the reference to sub-section (3) of section thirty-one of the Summnry Jurisdiction Act, 1879.

(2) Nothing in Section eight of this Act shall prevent owners or occupiers of land in Ireland from laying or causing to be laid any poison or poisonous matter as therein described, after a notice has been posted in a conspicuous place, and notice in writing has been given to the nearest constabulary station.

18. Except so far as applying to Scotland, the enactments mentioned in the Second Schedule to this Act are repealed to the extent mentioned in the third column of that schedule.

19. (1) This Act shall come into operation on the first day of January nineteen hundred and twelve.

(2) This Act shall not apply where proceedings have been instituted before the commencement of this Act.

(3) This Act may be cited as the Protection of Animals Act, 1911.

SCHEDULES.—FIRST SCHEDULE.

1. The name of the knacker, together with the word "knacker," shall be painted or affixed in a conspicuous manner over the door or gate of the knacker's yard.

2. The hair shall be cut from the neck of any horse, ass, or mule directly the animal has been delivered to the knacker.

3. All animals shall be slaughtered, with as little suffering as possible, within two days from the time they have been delivered to the knacker. Any animal which is in pain shall shall be so slaughtered without delay.

4. All animals shall be properly fed and watered after they have been delivered to the knacker.

5. No animal shall be used or employed for any work after it has been delivered to the knacker.

6. The knacker shall enter in a book kept for the purpose such a full and correct description of the colour, marks, and gender of every animal delivered to him as may clearly distinguish and identify the same, and the name and address of the owner thereof, and the book shall be produced by him before any justice of the peace upon the requirement of such justice, and the knacker shall allow such book to be inspected and extracts to be made therefrom at all reasonable times by any police constable or by any other person authorised by a justice of the peace.

7. No person who is under the age of sixteen years shall be admitted to, or permitted to remain in, the knacker's yard during the process of slaughtering or of cutting up the carcase of any animal.

8. No animal shall be killed in the sight of any other animal awaiting slaughter.

9. The knacker shall not sell or part with alive, or cause or procure or permit any person to sell or part with alive, any animal which has been delivered to him.

SECOND SCHEDULE.—ENACTMENTS REPEALED.

26 Geo. 3. c. 71.	The Knacker's Act, 1786. *Extent of repeal*: Section four.
7 & 8 Vict. c. 87.	The Knacker's Act, 1844. Section three.
12, 13 Vict. c. 92.	The Cruelty to Animals Act, 1849. The Whole Act, so far as not already repealed.
17, 18 Vict. c. 60.	The Cruelty to Animals Act, 1854. The whole Act.
26, 27 Vict. c. 113.	The Poisoned Grain Prohibition Act, 1863. The whole Act.
27, 28 Vict. c. 115.	The Poisoned Flesh Prohibition Act, 1864. The whole Act.
39, 40, Vict. c. 13.	The Drugging of Animals Act, 1876. The whole Act.
63, 64 Vict. c. 33.	The Wild Animals in Captivity Protection Act, 1900. Whole Act.
7 Edw. 7. c. 5.	The Injured Animals Act, 1907. The whole Act.

The Doomed Horse Cab.

The picturesque Berlin cabman, with his white enamel hat, his out-of-date vehicle, his aged horse, his exorbitant charges, and his ungrateful manners, is to disappear. The Chief of Police rules that the obsolete conveyances can no longer be allowed in the thoroughfares of the city after April 1st next. Compensation (£30) is to be paid to each of the sixty licensed drivers who are affected, and application for permission to drive motor vehicles is to be favourably considered provided they are able to qualify.—*Evening News.*

DISEASES OF ANIMALS ACTS 1894 TO 1911, SUMMARY OF RETURNS.

Period.	Anthrax. Outbreaks Confirm'd	Anthrax. Outbreaks Reported	Anthrax. Animals Confirm'd	Anthrax. Animals Reported	Foot-and-Mouth Disease. Outbreaks	Foot-and-Mouth Disease. Animals.	Glanders * (including Farcy) Outbreaks	Glanders * (including Farcy) Animals.	Parasitic Mange. Outbreaks	Parasitic Mange. Animals.	Sheep Scab. Outbreaks	Swine Fever. Outbreaks.	Swine Fever. Slaughtered.
GT. BRITAIN. Week ended Feb. 10	30		31				4	4	110	219	14	67	1123
Corresponding week in 1911	28		23				6	11			34	41	571
Corresponding week in 1910		27		29			11	38			23	20	147
Corresponding week in 1909		29		35			14	58			46	28	283
Total for 6 weeks, 1912	152		168				18	39	853	2212	91	369	4386
Corresponding period in 1911	132		145				29	80			185	213	2346
Corresponding period in 1910		179		212			43	136			183	122	837
Corresponding period in 1909		168		210			59	154			236	186	1326

* Counties affected, animals attacked: London 2, Middlesex 2.

Board of Agriculture and Fisheries, Feb. 13, 1912.

	Outbreaks									
IRELAND. Week ended Feb. 10	...	...	...	...	...	...	2	14	2	10
Corresponding Week in 1911 ...	1	1	...	...	...	...	4	10	2	56
Corresponding Week in 1910 ...	...	...	...	...	...	...	2	18	...	...
Corresponding Week in 1909 ...	...	...	...	...	...	...	4	7	...	...
Total for 6 weeks, 1912 ...	1	1	...	...	...	...	13	124	15	164
Corresponding period in 1911 ...	3	3	...	...	..	...	15	126	21	341
Corresponding period in 1910 ...	2	2	...	...	...	...	15	135	5	156
Corresponding period in 1909 ...	1	1	...	...	...	...	16	92	3	12

Department of Agriculture and Technical Instruction for Ireland, (Veterinary Branch), Dublin, Feb. 12, 1912

NOTE.—The figures for the Current Year are approximate only. * As Diseased or Exposed to Infection

COLLODIAL SOLUTIONS AND ARTIFICIAL ENZYMES.

Among the many departments of scientific work in which the researches of recent years have led to notable progress, two which are of considerable interest and importance are the study of colloidal solutions and that of enzymes and enzyme action. These branches of investigation are not altogether independent of each other, and in particular they converge on questions of the chemistry of physiological processes. In this field it is claimed by some that the results already arrived at are of great importance to practical medicine, and it will not be out of place here to give a brief summary of this part of the subject.

The systematic study of colloids was first undertaken by Thomas Graham, and various papers on the subject were published by him in the years 1861 to 1864. In investigating the properties of substances in solution, Graham found that the bodies studied could be arranged in two classes, to which he gave the names *crystalloids* and *colloids*. The most characteristic and constant difference between them was that the former can diffuse, when in solution, through a membrane of parchment or similar material, while the latter cannot. The terms are still retained with the same general meaning as that given by Graham; but instead of considering crystalloids and colloids as different classes of bodies, investigation has shown that it is more correct to speak of the crystalloidal and colloidal states of matter, since a large and increasing number of substances have been obtained in both kinds of solution. Graham used the term *sol* to denote a colloidal solution, and this term is now in general use in this sense, such solutions being called *hydrosols* when water is the medium, *alcosols* when the solvent is alcohol, and, generally, *organosols* when the solvent is an organic liquid. The coagulated form of a colloidal substance is called a *gel*, and a gel formed from a hydrosol and retaining water is a *hydrogel*. A sol may be converted into a gel in a variety of ways, two of the most usual being the addition of an electrolyte and the application of heat; in some cases a reversal of the conditions restores the sol form of the colloid, but in other cases the gel cannot be redissolved by any such means. In accordance with their behaviour in this respect, colloids may be classified into reversible and irreversible, and the distinction is of some practical importance.

Some of the most interesting of the sols which have been studied in recent years have been those of the metals; gold, platinum, silver, mercury, and many other metals have been obtained in the form of hydrosols, while others, such as the alkali metals, have been obtained as sols in certain organic solvents. An impure sol of silver was prepared as long ago as 1839 by Wöhler, although its real nature was not understood by him; the method used in preparing it—heating silver citrate in a stream of hydrogen—gives substantially the same product as the "colloidal silver," or "collargol," which has found its way into medicine in recent years. Another metal which has found some therapeutic application in the form of a sol is mercury, and colloidal calomel is also employed. A more familiar example, now much less used than formerly, is the so-called "dialysed iron" (liquor ferri dialysatus), which consists of a hydrosol of ferric hydroxide. The addition to this of a very small quantity of sodium sulphate, or of some other salt hav-

ing no *chemical* action upon it, causes "gelatinization" of the liquor, or, in other words, converts the sol to a gel; and the other sols just alluded to show a similar behaviour on the addition of a trace of an electrolyte. On the othec hand, many of the common colloids only show reversible changes; a fairly strong solution of gelatin, for example, sets to a "solid" or a gel on cooling, but resumes the sol form on again raising the temperature; a large excess of salt will throw out the gelatin, but on washing away the salt it can be redissolved. An important fact is that in some cases if the sol of an irreversible colloid is mixed with the sol of a reversible one the mixture is reversible,

Colloids differ from crystalloids, not only in being non-diffusible, but also in the fact that they have no osmotic pressure, or almost none; hence the boiling and freezing points of the solvent are not altered by the colloid as they would be by the presence of a dissolved crystalloid. It is not possible at present to make positive assertions as to the actual condition in which a substance exists when in colloid solution, but a good deal of knowledge with regard to the matter has been gained in recent years by the use of the ultramicroscope in the form given to it by Siedentopf and Zsigmondy. A pencil of convergent rays of light is passed into the solution under investigation, and the path of the beam is examined, against a black background, with a strong microscope. In the case of a perfectly homogeneous liquid nothing is seen; the light passes without diffraction or reflection, and none of it, therefore, is diverted into the microscope. But if the liquid contains solid particles in suspension (which may be far too small to be detected by ordinary microscopical examination in a bright field), some of the rays will be scattered by reflection at the surfaces of the particles; if they are sufficiently numerous and of sufficieni size, the amount of light so scattered may be sufficient to be perceived by the unaided eye, and the path of the rays will then appear luminous; on examining it with the microscope the luminosity may be seen to be not continuous, but to proceed from numerous small particles, which reflect portions of the beam.

A good analogy is furnished by the familiar fact that if a penctl of rays of sunlight passes through a hole in a shutter into a darkened room in which the air is perfectly still and pure, the rays are invisible from a point at the side of their path, and are only perceived by the image formed on the opposite wall; but if thc air has been recently disturbed the particles of dust floating in it scatter so much of the light that its path appears luminous from a little distance, while closer inspection shows the particles of dust as brilliantly illuminated objects, although they become invisible if light is freely admitted into the room.

If ordinary distilled water, even after filtration, is examined with the ultramicroscope, it is seen to contain numerous suspended particles, and it is only after standing undisturbed for weeks, in order that they may subside, that it is obtained tolerably free from them. If a colloid solution is examined with the ultramicroscope it usually shows numerous particles of varying sizes in active movement; in some solutions, however, only a general luminosity has been observed, discrete particles not being distinguishable. When particles are suspended in a liquid of greater or less density than themselves, motion is always observed, and has received the name Brownian movement. The movements to be observed in a colloidal solution with the ultramicroscope, however, have not the characters of the usual Brownian motion. Zsigmondy thus describes his first examination of a metallic hydrosol, in which he expected to see the ordinary Brownian movement of particles:—

"How entirely erroneous was this idea! The small gold particles no longer float, they move, and that with astonishing rapidity. A swarm of dancing gnats in a sunbeam will give one an idea of the motion of the gold particles in the hydrosol of gold. . . . This motion gives an indication of the continous mixing up of the fluid, and it lasts hours, weeks, months, and, if the fiuid is stable, even years. . . . . The smallest particles which can be seen in the hydrosol of gold show a combined motion, consisting of a motion of translation by which the particle moves from 100 to 1000 times its own diameter in one-sixth to one-eighth of a second, and a motion of oscillation of a considerably shorter period, and on this account the possibility of the presence of a motion of oscillation of a higher frequency and smaller amplitude could not be determined, but is probable."

It is possible to arrive at approximate measurement of the particles thus rendered visible: in colloidal solutions their diameter is from 20*uu* down to about 1*uu* (1*uu*=one millionth of 1 mm.) They thus approach in smallness the limits which have been assigned from other considerations for the diameter of molecules. The motions which the ultramicroscope reveals are always going on, and were found to be undiminished after keeping for months. A statement of Graham's that "the colloidal is, in fact, a dynamical state of matter, the crystalloidal being the static condition; the colloid possesses Energia" is thus shown to be well founded.

Sols of metals may be prepared in several ways, one of the simplest being that introduced by Professor Bredig, of Heidelberg, in 1898, in which a current of electricity is passed between poles of the metal whose sol is required, below the surface of pure water. Some disruption of the metal of the kathode occurs, and the particles which fly off from it assume the colloidal state, the liquid becoming coloured after a short time and then consisting of a hydrosol of the metal. Sols of gold, silver, and platinum, containing about 0·004 or 0·005 per cent. of the metal, were so prepared, and the method has been modified and extended to other cases by Svedberg since 1905. The metallic sols so obtained are extremely sensitive to traces of electrolytes and to the influence of heat, the change to gels being irreversible. They possess some remarkable properties, before discussing which it will be necessary to refer to enzyme action.

The natural enzymes form a large group of bodies occurring in animal and vegetable organisms, characterised by having the power of inducing chemical changes in other bodies without themselves becoming changed; in other words, they are catalytic agents.

Various hypotheses have been put forward to account for catalytic action, but no one of them has been proved to be true to the exclusion of the others, and there is good reason to believe that the mode of action is different in different cases. One of the proposed explanations is that the catalyst acts by means of molecular vibrations; the molecules of the substance acted on are supposed to be already in a state of vibration, which becomes increased by sympathetic vibrations in the catalyst to such an extent that the vibrations pass the point of equilibrium, and the substance accordingly undergoes decomposition. According to another view, the substance acted on first forms a compound with the catalyst; then this compound breaks down more completely than merely into its two components, fresh products being formed, and the catalyst set free in its former condition. A third hypothesis is that the acceleration of a reaction caused by a catalyst is due to the altered solubility of the substance acted on, and to its having a different reaction velocity when dissolved in the medium *plus* the catalyst. Whatever the explanation of catalytic action may be, a remarkable fact about the organic catalysts known as enzymes is that the range

of their activity is extremely limited, so that a given enzyme which can cause the decomposition of some one substance is often quite powerless to effect the similar decomposition of some nearly allied substance; in other words, their action is specific in a high degree. For example, cane sugar is hydrolysed into glucose and fructose by the catalytic action of the enzyme invertase, which is unable to exercise a similar action on maltose (an isomer of cane sugar); for the corresponding hydrolysis of this the presence of another enzyme, maltase, is required. A few of the known enzymes can resolve a number of different bodies; thus emulsin induces the decomposition of any of the glucosides amygdalin, arbutin, helicin, salicin, phloridzin, daphnin, and others; but, as a rule, one enzyme can cause decomposition of one particular body and of no others, even stereo-isomerism being in many cases a sufficient difference, so that one of a pair of stereo-isomers is acted on by a given enzyme, while the other is not. Thus, whatever may be the mechanism of enzyme action, there must be some very close relation analogous to that between key and lock, between an enzyme and some grouping or structural arrangement in the molecule attacked.

Enzymes play an enormous part in the chemistry of the physiological processes of both plants and animals. That this is the case with the digestive processes has long been known, but further research has extended the observation to most of the chemical actions of living cells. This has necessarily meant a very large increase in the number of individual enzymes known; but it is probable that no enzyme has as yet been prepared in a state of purity, the fact that they are all colloids making purification extremely difficult, while it also makes the establishment of definite criteria of purity a much less easy matter than it is in the case of crystalloids. The fact that the natural enzymes are all colloidal substances leads naturally to the inquiry whether any other colloids, not produced by living matter as enzymes are, possess catalytic powers similar to those of the latter; and it is found that the simplest of all known colloids, the hydrosols of certain metals, possess in a high degree some properties resembling those of enzymes; and some enthusiastic workers on this subject have applied to them the names of "metallic ferments" or "artificial enzymes."

Although an enzyme has usually some specific and characteristic power of acting as a catalyst towards some one substance, many are capable of acting as catalysts towards certain other bodies also, the changes which result not being specific but being induced by many enzymes indifferently. The most general of such catalytic actions is that which causes hydrogen peroxide to break up into water and oxygen: the many enzymes capable of doing this are called peroxidases. This property is shared by the hydrosols of gold, silver, and other metals; but since the decomposition of hydrogen peroxide may also be induced by finely-divided metals in the solid state, such as platinum black, it must not be too hastily regarded as evidence of an enzyme-like nature in the sols. Another group of natural enzymes, called oxidases, are able to cause oxidation by means of the oxygen of the air, and some colloid mineral substances have been found to exhibit a similar action. Neilson has shown that colloidal platinum and platinum black are able to cause hydrolysis of starch and decomposition and resynthesis of fats. But no case appears to have been recorded in which an "artificial enzyme" has shown a specific power of catalytically inducing decomposition of only one substance, or even a small group; on the contrary, their catalytic power is always far more general than that of natural enzymes.

A striking similarity between enzymes and some inorganic colloids is seen in their sensitiveness to the inhibitive action of minute traces of certain substances; the proportion of catalyst to substance acted on, and of the inhibiting substance (which has been called a paralysator) to the catalyst, are very small—for example, a solution containing 0·00001 gram of colloidal platinum per c.cm. acting upon a solution of hydrogen peroxide containing 0·06 gram per c.cm., converted more than half of it into water and oxygen in forty minutes; the addition of 0·000000014 gram of hydrogen cyanide per c.cm. reduced the rate of change by one-half.

This resembles the effect which has been found to be produced upon living organisms by minute traces of certain metals in distilled water, traces far too minute for detection by any chemical analysis. Thus, mere immersion of a strip of clean copper in a vessel of distilled water containing a number of tadpoles, which would otherwise live in it for several weeks, is sufficient to kill them in a few hours. At the last *soirée* of the Royal Society (June 14th, 1911) Mr. Henry Crookes exhibited a number of cultures of *B. phosphorescens*, and photographs of cultures of *B. coli communis* and *B. prodigiosus*, showing the germicidal effect of certain metals. Nutrient fish-agar was poured into Petri dishes, each containing a small square of metal, and when the agar had set the surface was inoculated with the bacilli; after twenty-four hours they were found to have grown freely except in a zone round the metal. It is interesting to note, however, the differences between different metals in this germicidal effect. Gold, platinum, and a few others had no such action; copper, bismuth, zinc., etc., had a slight germicidal action; and silver and mercury were among those showing strong germicidal action.

Professor Albert Robin, of Paris, in a treatise entitled *Les ferments métalliques et leur emploi en thérapeutique*, has described the results obtained in a number of therapeutic trials of metallic hydrosols, prepared according to the method of Bredig described above. He refers to the theory that the catalytic powers of enzymes are not due directly to their constitution, but to their molecules being in a state of vibration and capable of communicating such vibration to other substances, and so to cause them to undergo chemical change; he expresses his own view that metallic sols, which he calls metallic ferments, act by virtue of the intense vibratory movement of their extremely minute particles. According to his experience the properties of the sols *appear* to be identical, whatever the metal dissolved; this is slightly qualified by the statement that he thought he had obtained more regular therapeutic results with palladium than with platinum and gold, but he found that the solutions of the two latter which he was using at the time underwent alterations more rapidly than the solution of palladium, and he ascribes the superiority of the latter solution to this fact. In regard to germicidal action, the experiments by Charrin, Monnier-Vinnard, and others which are quoted were all made with colloidal solution of silver, and showed a very high germicidal effect on pneumococcus, staphylococcus, and several other organisms; it would have been interesting to know how far similar properties were shown by gold and platinum, in view of Dr. Robin's statement that they did not appear to differ therapeutically, and the great differences in the germicidal actions of the metals themselves as shown by Mr. Crookes's experiments. In his therapeutic tests Dr. Robin employed hydrosols of silver, gold, platinum, palladium, and an organosol containing manganese combined with albumen and alkali. The hydrosols were prepared by Bredig's method; as already noted, they are immediately converted into gels by the addition of an electrolyte or by heat, and consequently they cannot be employed in isotonic solution, nor can they be sterilised by boiling; the author states, however, that these hydrosols should alone be used, and not those preparations in which the addition of a reversible colloid has produced a more stable mixture. His words on this

point are emphatic: "It is necessary to call the particular attention of practitioners to the fact that it is impossible to use in practice with advantage metallic solutions said to be stabilised by an organic colloid, sterilised by heat, and containing sodium chloride or other salts designed to render them isotonic. There are, in fact, a number of commercial preparations thus produced the use of which can only lead to failure or to incomplete results by which therapeutic agents of the highest value are discredited." He also insists that Bredig's silver hydrosol is quite a different thing from collargol, and gives a list of reactions in which they behave quite differently; it is interesting to note, however, that Zsigmondy examined Carey Lea's colloidal silver with the ultramicroscope in comparison with Bredig's, and found that at suitable dilutions, the number, size, and motions of the particles were much alike in both.

An account of the results recorded by Dr. Robin would be beyond the scope of the present general summary; it will suffice to say that he described in some detail the use of these colloids in various diseases, including pneumonia, acute rheumatism with complications, meningitis, typhoid fever, scarlatina diphtheria, and puerperal septicæmia, in which the results appear to have been very favourable, and Bright's disease, secondary syphilis, pulmonary tuberculosis, and cancer, in which no benefit was obtained.—*Brit. Med. Journ.*

THE CANADIAN REPORT, 1910-11.

The Report of the Veterinary Director-General and Live Stock Commissioner to the Department of Agriculture, Canada, for the year ending March 31, 1911, is a volume containing 388 pages of closely written literary matter, exclusive of the index and some appended maps and figures; and the whole is of exceptional interest.

The first 94 pages are taken up by the main report of the then Veterinary Director-General and Live Stock Commissioner, Dr. J. G. Rutherford, C.M.G. This surveys the whole of the year's work in connection with both the health of animals and the live stock industry. Not a little of is statistical; and the whole, while deeply interesting, covers far too great a variety of subjects to be even summarised adequately here. Leaving almost the whole of it, therefore—from the suggestive opening remarks upon the decrease in Canadian exports of live stock and meat onwards—we merely note, at the absolute conclusion, that the comparatively recent amalgamation of two Governmental branches seems to be working well.

Dr. Rutherford's concluding sentences are:—"The wisdom of the arrangement by which in 1906 the activities of the Health of Animals and Live Stock Branches were combined under one head becomes yearly more apparent. These branches which formerly crossed and overlapped each other to a regrettable degree, now work harmoniously together, and by this co-operation achieve infinitely better results, while at the same time effecting a very appreciable saving in salaries and other expenses." Certainly there seems very much to be said in favour of working the two branches in combination in all countries.

The lengthy remainder of the volume is taken up by a number of appendices. Amongst them are reports of different officials concerning their special provinces, Acts of Parliament and quarantine regulations (the question of quarantine, as might be expected in a country like Canada, looms large throughout the report), the records of performances of pure-bred dairy cattle, and—last but not least—a number of scientific reports of the work done in special laboratories or in the investigation of certain diseases. Perhaps the most interesting of the latter is the account given by Dr. S. Hadwen, V.S., First Assistant Pathologist, of his researches upon the peculiar disease known as "redwater" in the cattle of British Columbia. This is not a hæmoglobinuria, but a hæmaturia or hæmorrhagic cystitis. Its exact mortality is somewhat doubtful, but is certainly high; and its causation is quite obscure at present. Formerly it was regarded as contagious: but Dr. Hadwen's observations tend to negative this view, and to cast suspicion upon dietetic and climatic influences. The main symptoms are hæmaturia, emaciation, occasionally icterus, and often, in the later stages, dropsy. The post-mortem lesions are insignificant, and are confined to the bladder and liver, with only occasional changes in the kidneys. Treatment, so far, has not been very satisfactory: but calcium lactate seems to give the best results.

Equine Swamp fever, which is attracting increased attention in North America and Canada, also formed the subjects of special reports by various officers; while, of course, statistics of all important diseases are included in the volume. Speaking generally the progress made with all these has been exceedingly good, and perhaps especially so with regard to anthrax, black quarter, and sheep scab. Rabies, which was re-introduced from the State of New York in 1907, and since assumed a serious aspect in Canada, has now been brought under control.

The last appendix (Appendix xxiii), with five additional sub-appendices arising from it, is a reprint of the first report of the International Commission on the Control of Bovine Tuberculosis and those of its committees. In 1909, the American Veterinary Medical Association appointed this Commission, the members of which (at first twelve in number, but afterwards rising to fourteen) were representative of both Canada and various of the United States, to "" "study the methods of the Control of Bovine Tuberculosis" and report thereon to the Association. A word of explanation of how this has been done is here necessary. No experiments have been performed, and no expert evidence has been taken. To quote from the report—"The members fully understand that the purpose which their appointment was intended to serve was less the acquisition of new knowledge regarding bovine tuberculosis than the careful study of the knowledge already available, and of the thoughts and opinions of those most entitled to speak with authority on the subject. The conclusions reached in this report are, therefore, simply the outcome of an earnest and thoughtful consideration of the various modern aspects and phases of the problem, with the object of crystallising public opinion and so clearing the way for legislative action." " The Commission, therefore, is a deliberative rather than an investigatory body; and as its *personnel* included many men—such as Rutherford, the late Leonard Pearson, Torrance, and others—having very special knowledge of the subject, the result of its labours could hardly have failed to be valueable. The report deals with every aspect of the subject on broad lines, and therefore consists partly of an explanatory summary of the existing knowledge of tuberculosis and its eradication, and partly recommendations based upon that knowledge.

The summary, naturally, contains nothing that is not familiar to every veterinarian; the suggestions for action may be briefly described as consisting, in the main, in the slaughter of clinically affected animals and the building up of new tubercle free herds on lines similar to those of Bang. Along with these measures, general advice regarding prophylaxis is given; and the subject throughout is dealt with very broadly, it being admitted that different local conditions may necessitate some modifications in the details of the operations. While recognising the necessity for compulsory legislation upon the disease, the Commission lay great stress upon the need for popular education regarding the subject

as an indispensable adjunct. Certainly the report itself, which is written throughout with admirable simplicity and clearness, may be expected to exercise a very potent educative influence indeed.

Taking this large volume as a whole, we have only one regret upon laying it down. And that is, that the work of which it treats is now going on without the aid of Dr. Rutherford, who has done so much for the agriculture and veterinary science of Canada in the past.

Potassium Permanganate in Fistulæ.

There is little doubt that oxidation and allied conditions often act upon ærobic as well as upon anærobic bacterial lesions, and the fact that many a chronic case of empyema is hastened in its healing by oxygen put into the wound by means of a sterilised glass cannula attached to an oxygen cylinder is familiar enough. There are certain other conditions in which the application of oxygen is less easy, and the use of certain oxidising agents may be resorted to. The effectiveness of potassium permanganate crystals inserted into a snake-bite immediately after its occurrence is known to many people who have lived in the Tropics: Dr. Scobie advocates its use in a somewhat similar way for the cure of tuberculous fistulæ.

Amongst other cases he had a male patient, twenty-eight years of age, who suffered from tuberculosis of the left lung and from two tuberculous areas in the region of the anus. These were situated to the left of the anal aperture, each being half-an-inch in length and apparently healed, but examination in a good light showed that they were still discharging a little pus; to the right of the anus there was a bluish unhealthy-looking swelling about the size of a bantam's egg, the residue of an ischio-rectal abscess which had been incised but which had filled up again. When opened it discharged a tablespoonful of thick pus. Careful probing of all three lesions did not reveal anything in connection with the bowel. The patient was in a very emaciated condition, and would allow of no further operative treatment. Crystals of potassium permanganate were introduced into the healthier of the two fistulæ after it had been carefully washed out. The patient experienced a sharp pain lasting about a minute, but there wns no other discomfort; the treatment was continued for three weeks, the crystals being allowed to dissolve slowly in the feeble discharge. The result was a perfect healing of the fistula. Dr. Scobie, thus encouraged, packed the other in the same way twice a week, and in two months' time it also healed up finally. The ischio-rectal abscess was now washed out with hot, freshly made permanganate solution, the interior being thereafter filled with crystals of permanganate of patash. The cavity being larger than the others had been, the patient experienced more pain, and this lasted about an hour after the crystals were inserted but the effect on the discharge was considerable and marked. The general health of the patient continued good, and the cavity steadily shrunk up until presently there was no pus visible except at intervals of a week or ten days, and in due course the wound healed as the others had done.

Potassium Permanganate in Treatment of Cholera.

Mr. H. D. Pant, L.M.S., Lucknow, says that he called attention to the use of potassium permanganate, which he has employed for seventeen years, in a discussion which followed the reading of a paper on the treatment of Asiatic cholera by Major Leonard Rogers, at the Bombay Medical Congress in 1909. He adds the following quotation from the transactions on the Congress:—"Hypodermic injections of camphor, rectal injection of saline solution, and teaspoonful doses every quarter or half an hour of a solution of permanganate of potash, gr. ½ to oz., are my sheet anchors during collapse. What effect the permanganate has, and how I came to adopt it, I am unable to explain. Suffice it to say that the use of this drug has satisfied me and my patients by giving force to the wavering and flickering pulse."

R.S.P.C.A. Prosecutions at Reigate—Dismissed.

Harry Fright, of St. John's Road, Redhill, horsekeeper, was summoned for cruelty to a horse by causing it to be worked in an unfit state at Redhill on the 15th January.—Mr. G. L. Patten, solicitor, defended, and pleaded not guilty.

Inspector Tetley said on the 15th January he was in the Brighton Road and he saw a horse attached to a four-wheeled van. The horse was very lame on the off fore limb, and was in pain. The same day he saw the defendant, who said the horse had gone rather bad while they had had it. Witness referred to a previous occasion when he sent the horse home, and the defendant said he thought the shoe was then pinching it. Witness saw the horse on two later occasions, and it was still lame.

Richard A. Thrale, M.R.C.V.S., said on the 17th January he examined the animal, and found it very lame on the off fore limb, and it was totally incapable of doing any kind of work.

For the defence, James Washer, the driver of the horse in question, said on the first occasion when the horse was stopped Inspector Tetley told him that he thought it was all right for light work walking. The horse had always been walked since. On the 15th January the horse was only going a bit stiff.

Defendant, on oath, said there was no heat in the leg, and the animal did not flinch when he touched the tendons. He thought probably the shoe was a bit tight. When he saw the horse on the 15th he could find no lameness.

Charles A. Squair, M.R.C.V.S., said he saw the horse on the 19th January. It was in very good condition and he noticed it went rather stiff on the off fore limb—an altered gait, which would look like lameness to an ordinary individual, but there was no pain whatever. It was mechanical lameness. There was no cruelty in working the horse.

Herbert Sargant, the employer of the defendant, said the horse had the sprain when he bought it about nine months ago.

Alfred Glover, M.R.C.V.S., said on 22nd January he saw the horse, and he agreed with the evidence of Mr. Squair.

The Chairman said the Bench had decided to dismiss the case. The Society's costs were remitted.

Defendant was then summoned for a similar offence alleged to be committed on the 16th January.—Mr. G. L. Patten, solicitor, defended, and pleaded not guilty.

Inspector Tetley said a bay gelding which he examined was uneasy. There was a sore about the size of a shilling, and the action of the collar on it must have caused it pain. When he saw the defendant he said he saw the defendant he said he was sorry it was rubbed like it was, and if he had noticed it he would not have sent the horse out. It was caused by a too large collar rubbing on it and he had treated it by putting ointment on it.

P.C. Mann also gave evidence, and said one had difficulty in seeing the sore, as the horse was restless.

Richard A. Thrale, M.R.C.V.S., said on the 17 January the swelling on the withers was larger than a chicken's egg. He did not look at the sore. The enlargement was denuded of hair.

Inspector Tetley said the sore adjoined the swelling.

For the defence, Joseph Collins, the driver of the horse, said that the sore was no bigger than a threepenny bit. The swelling was not there when he went out, and when he came back it was present; it was more prominent.

Defendant, on oath, said the collar, when it was put on the horse, did not touch the "place."

Charles A. Squair, M.R.C.V.S., said he examined the horse on the 22nd January, and it had a prominent wither. He came across a wound less than the size of a pea—a mere speck. A considerable quantity of hair was rubbed off the wither, and it was his opinion there was no swelling. With his experience he thought it was the most trivial case that had ever been brought before the Bench.

Alfred Glover, M.R.C.V.S., corroborated.

The Chairman said the Bench had decided to dismiss the case against the defendant. The costs would be remitted to the Society.

A summons against Joseph Collins, of Earlswood Road, Earlswood, for working the horse, was withdrawn.

Mr. C. Stephenson's Gift to Armstrong College.

A meeting of the Council of Armstrong College was held at Durham on Monday afternoon, February 12th, Sir Hugh Bell presiding.

Dr. Hadow, the Principal, announced that he had received from Mr. Clement Stephenson, veterinary inspector for Northumberland, an offer to give £5,000 for the proposed buildings for a new agricultural department at the College to undertake advisory work among farmers in the North of England. The scheme has been planned at the invitation of the Board of Agriculture under the scheme proposed by the Development Commissioners.

The Council accepted Mr. Stephenson's offer with cordial thanks. It is hoped that the new buildings will house the present agricultural department of the College, the head of which is Professor D. A. Gilchrist. The site has not yet been definitely fixed, but it will probably be within the College grounds.—*The Times.*

Use of Armorial Bearings—L.C.C. v. Kirk.

At the Bow Street Police Court, on Friday, 9th inst., Mr. Curtis Bennett was called upon to deal with a case, remitted from the High Court, against Mr. William Kirk, a veterinary surgeon, for using armorial bearings without a licence.

The armorial bearings consisted of the arms of the Royal College of Veterinary Surgeons which Mr. Kirk, in common with many other members of the College, had had printed on his business notepaper. As reported in *The Times* of June 10, the summons was dismissed by the magistrate, but on appeal by the London County Council, it was decided that there ought to have beeen a conviction, and the case was sent back for the magistrate to fix the penalty.

Mr. Philip Conway, who defended, reminded the magistrate that Mr. Kirk used the arms in conquence of permission which the Inland Revenue Authorities gave to the members some 20 years ago.

A penalty of 3s. and 2s. costs was imposed.

Arthur Chapman, a Waltham Abbey magistrate, was fined £1 4s. 6d., including costs, by the Bench, of which he is a member, for failing to notify the police of a case of parasitic mange on his premises, the Abbey Farm, Waltham Abbey. Colonel E. W. Postans, of The Grange, Sewardstone, Essex, was similarly fined for a ike offence.

Donations to R.C.V.S.

The Secretary of the Royal College of Veterinary Surgeons begs to aknowledge the receipt of the following donation to the College funds from:

Mr. H. G. Bowes, Leeds	£1	1	0
Amount previously acknowledged	6	6	0
	£7	7	0

Personal.

FAITHFULL-DAVIS.—On the 9th inst., at 9 Queen Street, Hadleigh, Suffolk, to Mr. and Mrs. T. Faithfull-Davis, a son.

Mr. WALTER JAMES BEART, M.R.C.V.S., aged 74 years, of King's Lynn, Norfolk, veterinary surgeon to the late King Edward VII. from 1863—1910, left estate of the gross value of £15,184 12s., of which the net personalty has been sworn at £13,331 12s. 11d.

ACCIDENT.

On Tuesday evening last Mr. E. H. Leach, of Newmarket, had attended the meeting at Norwich of the Eastern Counties' Veterinary Medical Society, of which he was elected President, and about seven o'clock was just entering Wymondham on his journey home. When nearing the bend in the road at the entrance to the town, the chauffeur, in coming round the corner, mistook the turn, and the car ran on to the path on the off side. Finding he was running into the hedge, the driver turned, and in getting off the path collided with a telegraph pole with considerable violence. Mr. Leach, who was inside the car, a Daimler landaulette, was thrown forward, his head going through the front window of the car. As it was evident that his injuries were severe, Mr. Barnard, who was on the road close by, sent into the town for a doctor, who considered it advisable to remove Mr. Leach home with all speed. Mr. Goffin, of the King's Head, accordingly motored the injured man to Newmarket in company with Dr. Maurice Hughes. Mr. Leach's car was considerably damaged, the front wheel being stripped, and the axle spring smashed. —*Eastern Daily Press.*

Indian Silahdar Cavalry.

Few of the British public, and it might be added few even of the officers of the Army outside India, know anything of the organisation of that fine body of fighting men who form that portion of the native army of India which enjoys the somewhat puzzling title of Silahdar cavalry. Of the thirty-eight regiments of Indian cavalry only three are "regular" regiments, the remaining thirty-five being Silahdar or irregular cavalry. It may be explained that the term Silahdar means in Persian an armed man, and is the name given to the Khudaspa, the horsemen who owned their own horses and weapons. and were the mounted soldiers of feudalism, the Indian Silahdar cavalry preserving in itself the last relic of feudal organisation. It will easily, therefore, be understood that the Indian cavalry soldier very naturally occupies a position of honour and social distinction, not only because of his services under the British Raj, but because he comes from the backbone of the Indian peoples, the landowner and farmer class, the sons of the soil.

The irregular cavalry is of pecular importance in India. It is the favourite arm of the native, and attaches

him to our service by the strong ties of interest and affection, and it prevents him being engaged against us. He comes of the warrior class, one entitled to bear arms, a yeoman—that is, one who possesses property of sufficient value to enable him to ride to battle on his own horse, with his own equipment, transport and arms. In practice, however, the Silahdar no longer brings his own weapons and mounts, because it is necessary for the Service to have the most modern weapons and the best horses, but he brings the cash equivalent of a horse and baggage pony, which amount is duly paid into the funds of the regiment. This is known as *assami*, and represents the value of the property the trooper is bound to maintain in order to be an efficient soldier. He is then allotted a horse and half a share in a baggage pony or mule, and is debited with the value of the saddlery, uniform, and necessary kit, which he is usually glad to take over from the man to whose vacancy on the latter becoming non-effective he succeeds. The share in the economy and organization of the regiment which he thus acquires the trooper will have to maintain by monthly deductions from his pay and horse allowance, the subscriptions serving as a guarantee against the death of the horse and of deficiencies in, and the inevitable deterioration of, kit. All that Government does for him is to supply bandolier, rifle, ammunition, and the cost of the food of the horse and the half-share of a transport animal. The heavy business of maintaining, equipping, and mounting regiments or four squadrons of 625 sabres or lances, as the case may be, devolves upon the man and upon his British and native officers. The cost of the renewal of the horse, baggage, pony, uniform, etc., is met by the man's subscriptions, which not only suffice for the purpose, but leave a surplus which forms the insurance effected by the regiment against the depreciation of its live and dead stock, and by which means some regiments amass considerable funds. When a man goes to pension or in any other way becomes non-effective he receives from the incoming recruit the value of his paid-up share in the regiment which he as a recruit purchased on the commencement of his service and now sells, with his kit and accoutrements, to his successor.

I have had the advantage of reading the opinions on this subject of Col. Norman, of the 22nd Cavalry (Frontier Force), and of Capt. Wallis, of the 20th Deccan Horse, both of whom endorse the high opinion which is so generally held of the traditions, the proud achievements, and the merits generally of the Silahdar cavalry, and of their feudal devotion to their officers. There is something financially very sound in an organisation such as this. In comparison with its cost to the Government, the Silahdar cavalry is probably the most efficient arm in the world. It certainly compares more than favourably with the three Indian regular cavalry regiments, the entire cost of which is borne by the Government. A Silahdar regiment costs annually 422,521 rupees, or some 23,300 rupees less than a regular regiment; and it has the further advantage of possessing twenty-three men, 109 horses, and 320 transport mules more than the non-Silahdar. A Silahdar regiments is self-supporting, maintaining its remounts, stabling barracks, troop servants such as grooms, washermen, cooks, tailors, saddlers, and a great part part of its conservancy and sanitation.

The system is, of course, not free from defects, such as the want of uniformity in equipment, the doubt of its ability to maintain the supply of horses in time of war, and the difficulty which many regiments experience in making both ends meet; but generally speaking, self-contained, self-supporting, loyal, and efficient, as they undoubtedly are, the Indian Silahdar cavalry regiments are fit and prepared to go anywhere and do anything. —*The Field.*

ARMY VETERINARY SERVICE.

Extract from *London Gazette.*

WAR OFFICE, WHITEHALL, Feb. 9.

TERRITORIAL FORCE. ARMY VETERINARY CORPS.

Lieut. H. Edie resigns his commission. Dated Feb. 10.

Feb. 13.

REGULAR FORCES. ARMY VETERINARY CORPS.

The following Lieuts. to be Capts. :—

H. A. Stewart, G. B. C Rees-Mogg, H. C. Stewart, T. Lishman, R. Tindle, S. Black. Dated Feb. 13.

At an examination held at Aldershot on January 31, and following days, the undermentioned candidates were successful and have been recommended for Commissions as Lieutenants on probation:

G. V. Golding, H. E. Lewis, D'Arcy S. Beck, H. Stephenson, T. L. Shea.

The following transfers have taken place: Capt. L. M. Verney, from Bulford to Newcastle-on-Tyne. Capt. T. E. Burridge from Bulford to Woolwich for duty with No. 2 Remount Depot.

ARMY VETERINARY SERVICE.

ENTRANCE EXAMINATION: JANUARY, 1912.

VETERINARY MEDICINE.

Time allowed, Two Hours.
Maximum marks, 1,000 (250 each question).

Discuss the bacteriology of strangles, and give the general line of treatment you would adopt in an outbreak of this disease.

What are the different methods employed in the preventive inoculation for rinderpest in cattle?

Define piroplasmosis, and state where the causal agent is found, and how the disease is conveyed from one animal to another.

What are the generally recognised causes of purpura hæmorrhagica?—and outline the symptoms and treatment.

VETERINARY SURGERY.

Time allowed, Two Hours. Maximum marks, 1,000.

Discuss the causes, symptoms and differential diagnosis of navicular disease.

What are the causes, symptoms, and treatment of traumatic arthritis in horses? Name the joints most frequently involved.

Describe fully, either of the following operations:—
(*a*) Median neurectomy. (*b*) Tracheotomy.

Discuss paralysis of the facial nerve in horses, and arrange under the following headings the principal causes and symptoms:—(*a*) When the paralysis is confined to one side. (*b*) When double-sided.

VETERINARY HYGIENE.

Time allowed, Two Hours. Maximum marks, 1,000.

What are the principles of disinfection? Describe the routine of disinfection and general prophylaxis you would adopt in a stable occupied by eight (8) horses, from which a case of sarcoptic mange has been diagnosed.

Enumerate the most common vegetable parasites affecting fodder or grain in the United Kingdom, and the general effect of these organisms on the food itself.

What are the common faults experienced in the preparation of horses feet for shoeing?

Discuss generally the following principles in the dietetics of horses:—(*a*) Watering prior to feeding. (*b*) Feeding in small quantities and often. (*c*) The abstention from hard or fast work following a full feed.

OBITUARY.

WILLIAM MOLE, M.R.C.V.S., 443 Bathurst St., Toronto, Canada. Graduated, Lond: July, 1876.

Death occurred in hospital on August 6, 1911. A correspondent adds:

"A few hours before he was taken to the hospital he was sure he had rabies, having been bitten about two months before. His own doctor was on his holidays, but the doctor engaged said he had one symptom of rabies. When he was in the hospital two hours, three doctors thought he had rabies, but not one had seen a case. I may say about thirty cases in Toronto and surroundings have been treated for rabies. By his death the public have been ronsed: and he was so widely known the public would believe his statement."

The following is from a Toronto paper:

"One of the best known veterinary experts in Ontario was removed by death in the person of Dr. William Mole, 443 Bathurst Street. He was taken to the General Hospital on Friday, suffering from severe nervous breakdown, due to overwork and died on Sunday morning.

Dr. Mole, who was 60 years of age, came to Canada to better his health in 1890, and, after two years in Hamilton, became a resident of Toronto. He was foremost in founding the Toronto Veterinary Medical Association and was identified with the Canadian Institute. He wrote extensively for numerous publications on veterinary matters. He was a Conservative, though not active in politics, a Mason, and member of St. Stephen's Anglican Church.

Dr. Mole is survived by a widow, three sons, and three daughters, The sons are William, Hugh, and Lewis, of Toronto, and the daughters, Elsie, of Calgary, and Dorothy and Nellie at home."

W. OVERED, Aylsham, Norfolk, died on Feb. 11th, at Wortwell, Norfolk. Aged 83 years.

The Late Mr. T. W. Butler.

Mr. Thomas William Butler, of Hampton, near Evesham, for many years was one of the best known veterinary surgeons in the district. He had been in failing health for the past three or four months, and for the last month had been more or less seriously ill. He attended Evesham stock sale as usual on the Monday, but had to be taken home in a conveyance, and he rapidly became worse, and passed away at 9.45 p.m. on Saturday. He was 71 years of age two or three weeks ago.

Mr. Butler was the son of a Yorkshire farmer, who somehow or other got into touch with a nobleman of Saxony, who owned large estates near Dresden. Mr. Butler's father was a very successful stock breeder, and the nobleman in question induced him to go out to Saxony to superintend his estates. Mr. T. W. Butler, who at this time was a lad, accompanied his father, who had him educated at a large college in Dresden, where there were something like sixty masters, and where the discipline and methods were very rigid. Mr. Butler always spoke strongly in favour of the system of education under which he pursued his studies, and compared it with the system of the English colleges very much to the disadvantage of the latter. Mr. Butler was in fact a highly educated man. He could speak German and French, was a good Latin, Greek, and Hebrew scholar, and had a fair knowledge of several other languages. His scientific attainments were considerable, and he was a very clever musician, performing on the piano and violin. When he had finished his college course he entered the Army for his term of service, and it is understood that he saw active service (though upon the point we have been unable to get authentic information) in the Austro-Prussian war.

Shortly after this he fought a duel. He was dancing at a military ball with the sister of one of the officers, when someone in the company began to make disparaging remarks on the fact that he was an Englishman. Mr, Butler promptly slapped the man in the face. There could be only one termination to such an episode. Seconds quickly settled all the necessary details, and it was a case of pistols for two and coffee for one. Mr. Butler killed his opponent on the spot, with a bullet straight through the heart. He himself was wounded, but he was hurried across the frontier and got home to England without mishap. He then qualified at London as a veterinary surgeon, and commenced practice at Bengeworth, shortly before the Franco-Prussian war broke out. During the war he was commissioned by Prussian officers to buy remounts; he purchased a very large number of horses in this district, and sent them across to his father, who was still on the estate near Dresden, and who sometimes had as many as a couple of thousand remounts at a time. For some years past he has acted as local inspector for the County Conncil under the Diseases of Animals Acts, and was to be seen on duty at Evesham Market every fortnight. Years ago—from 1876 to 1879 he was a member of the Evesham Town Council. He was the first district councillor for Hampton, holding office from December, 1894, till April, 1898, when he was defeated on the vaccination question by the late Mr. S. Summers. He was also one of the original members of the Hampton Parish Council.

In 1888 he bought the Hampton Manor Estate from Mr. J. G. Ledsam and went to live at the Manor House, where he has resided ever since. With the Manor went the manorial rights, so Mr. Butler was lord of the manor of Hampton. He was twice married: by his first wife (a Miss Sprague, of Evesham) he had a family of three sons and four daughters. His second wife died about 1898.

CORRESPONDENCE.

USE OF THE COLLEGE ARMS.

Sir,

After reading a report of the above in *The Veterinary Record*, I must confess that I am disappointed not only with the verdict but perhaps more so with the case.

In the first place I don't think it will affect a very large number of the members of the veterinary profe-sion who use "the arms of the Royal College" the whole of it and nothing else but it, and further are not ashamed of putting around it "Member of the Royal College of Veterinary Surgeons."

The Lord Chief Justice said, "But look at that notepaper and assume I received it. He has not put M.R.C.V.S. upon it. What is there to tell a man that is not his own crest."

Again His Lordship asks, "What there was to show, looking at the notepaper, that the gentleman was a member of the College."

A third time he says, "But here this gentleman has put within his own name a crest, and nothing in the world to show it is not his own crest, and nothing to show it is the crest of the Royal College."

In my humble opinion this all points to the fact that if we do use the Arms of the Royal College we must have something plainly printed on to show that we are members of that College, and that it is our College crest, and we shall be all right.—Yours faithfully, W. J.